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study, because of its very large organs. Note the position of pistil and stamen in the same flower, and in flower clusters; the drooping position of some flowers and the upright position of others.

Home economics.—During the fall quarter it was impossible to carry out the work planned in the study of foods, and in its place an optional class in cooking was formed after school hours. Based upon this experience of the class, six weeks of the winter quarter were devoted to work upon the food principles.

For the coming term work in physiology is planned from the following standpoint: Food is the basis of all animal life. How does the body obtain and use it? Comparison of the ways in which various animal structures are adapted to meet this need. This subject was chosen with the consciousness that it is utterly impossible to teach physiology in three months, and that at this time in child life a knowledge of the structure of the body and an appreciation of the wonder of its mechanism are helpful in creating respect and care for it.

This particular outline of the work was adopted because it seemed to offer a logical sequence in the thinking, and at the same time to give a single problem with which the children were capable of grappling, namely, animals' means of getting and use of food:

1. Obtaining food—senses and muscles. Comparison of the prehensile organs of animals—fish, quadruped, birds, man. The adaptation of a given structure to its environment, especially adaptation of birds. Stuffed specimens in the museum used in tracing this adaptation.

2. Crushing, tearing, or grinding food—teeth. Comparison of the teeth of various animals and their adaptation to the characteristic food of the animal. Examine skulls of cow, sheep, horse, dog, squirrel, and man which are found in the museum.

3. Making food soluble—mouth and digestive organs.

4. Distribution of dissolved food—blood-vessels.

5. Purifying blood—lungs and respiration.

This brings us to a point which we had reached from another standpoint during the winter. The study of air led to finding the lung capacity of each child, the composition of pure air and air exhaled from the lungs, and that carbon dioxide was the product of combustion. The study of the circulation therefore brings us to the same point and emphasizes the interdependence of functions.

EIGHTH GRADE.

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History.—As indicated in the previous outlines, the general plan of history work for the year consists of the development of the idea of government. The history of Rome was selected (1) to emphasize civic responsi-

bility, and (2) to show how the Romans solved problems of government similar to the problems which are now awaiting solution by our nation.

At all points of possible contact, comparisons have been made with the government of our country, our local government, and our treatment of colonies. As the functions of the local government have been taught in the preceding grades, the emphasis of attention has here been placed on the structure.

The work in manual training in the autumn quarter, which consisted of making furniture (screens, magazine cabinet, tables, couch, chairs, stools, tabourettes, shirt-waist box, bookcase, etc.), led to a consideration of the Roman house and its furniture. In this subject the interest was enhanced by a stereopticon lecture on the dwelling-houses of the Romans, given to the class by Professor Laing, of the Latin Department of the University, and also by a visit the class made to the Field Columbian Museum. The comparison between our modern house and the Roman house has led to a study of some scientific discoveries and inventions in their relation to the modern house. This study has centralized upon electricity, and other methods of heating and lighting, and the various systems of ventilation and plumbing in use in our homes.

In March (see *ELEMENTARY SCHOOL TEACHER*, February, 1903) the class will compare Rome's government of her provinces with our policy in Hawaii, Cuba, and the Philippines. Some study will be made of these islands, including their history, how they came into our possession, their value to us (their natural resources), and our national responsibility toward them. The necessity for close communication between them and the United States will lead directly into the subject of cables, especially the Pacific cables. The previous study of electricity will add to the interest of this topic, which will consist of a general survey of the cable lines of the world, including the history of the first submarine cable, the first Atlantic cable, the making of a cable, the method of taking soundings, the relation of temperature and the soil of the ocean bed to the cable, the laying of cables, mending them, etc. Information on this subject will be obtained from maps in the *National Geographic Magazine*, Vol. VII, and through articles and pictures in the *Commercial Advertiser* (cable edition, January 3, 1903), a daily paper published at Honolulu, Hawaiian Islands.

The pupils will discuss the effect of the long series of wars upon the social and economic life of the Romans, and, so far as possible, will imagine themselves in Rome, and, making the conditions their own, suggest measures for relief. The similarity between the agrarian troubles and our labor troubles will be brought out in the discussion. They will read the story of the Gracchi and their mother, Cornelia, and, after learning all they can about Marius and Sulla, will compare the efforts these men made at reform with the plans they themselves have already suggested. The biography of Cicero will follow as the typical life of a Roman. His idea of government

will be discussed, and the pupils will try to fit it to existing conditions, thus discovering for themselves the cause of his failure.

They will read of Cæsar, comparing his work as a public officer, a general, a writer, and a dictator. They will then read Shakespeare's *Julius Cæsar* and compare the Cæsar of history with the Cæsar of the play. By the use of clay-modeling, the pupils will express some of their ideas of Roman life. They will model groups of statuary illustrative of characteristic scenes, and tiles in low relief, together with simple objects found in the Roman home.

Latin.—The work in Latin will continue, the class reading simple stories of Roman life.

German (Herr Prokosch).—The reading-matter of the last quarter will be selected mainly from two points of view: (1) to give the children some first-hand knowledge of German history; (2) to make them, in an adequate degree, familiar with the names and principal works of the greatest German authors. Selections from German history, poems by Goethe, Schiller, Uhland, Rückert, *et al.*, will be read and partly memorized.

Nature study.—Gardening will form part of the work in nature study. The bed laid out by the eighth grade last year will be planted, and the vegetables grown will be used by the pupils for their luncheons. In making a study of the manner in which the various plants establish their necessary relations to light, heat, soil, air, and moisture, the pupils will consider the structure of the parts of the plant as determined by their function, and how the structure is modified by the environment of the plant. They will observe the plants in the school garden, at Washington Park, on the prairie, in the marsh (Sixty-first street and Greenwood avenue), and in the pond (Seventy-fifth street and Wentworth avenue). When questions arise which can best be answered by an experiment, the pupils will be encouraged to devise an adequate experiment. Besides the plants, the trees will form a center of study for the remainder of the year. Already the pupils have begun to form a picture of the present life of the tree, and they will compare the forms of various trees and their mode of growth, which involves the position, arrangement, and angles of buds and branches. In a study of the trunk as a center of growth, they will consider its external form in relation to the forces that act upon it, and after determining the function of the various parts of the internal structure, they will try to read the life-history of the tree as indicated by the growth of these parts. The drawings and paintings which will form a part of this record will show the forms of trees, the growth of twigs, and the appearance of cross, radial, and tangential sections of wood.

Early in March the pupils will begin to watch for birds and to make a natural-history calendar, containing the date, description, name, food, habits, etc., of the various birds as they appear. These birds, and the birds that have been with us through the winter, will be studied in relation to their food

supply. The class will consider the simultaneous appearance of the earthworm and the robin, the stage of growth of the larvæ at the time of the warblers' arrival, and the effect of this timely arrival upon the trees. The special modifications of bills, feet, wings, or tail, and the relation of this to the bird's manner of securing its food, will be illustrated by drawings or paintings.

Some attention will be paid to the earthworm, the pupils noting when and where it works and the results of its work. By observations, the children will acquaint themselves with the habits of the animal, its food, movements, habitual position of body, shape and appearance of burrows, depth of burrows, and the forces of earth and air it must meet in its environment. They will also make a close study of the worm through the microscope, noting the shape of the body, the muscles, spines, respiratory surface, eyes, skeleton, etc. From this they will determine the relation of function to form. They will read the results of Darwin's observations on this subject and discuss the effect of the earthworm upon the soil. The class will make paintings or drawings of the earthworm, and mold to show bulk of castings on a given area.

Insect life found in the garden and in the park will be observed. A record will be kept of the time and place of appearance, the food, the injuries made by the insect to trees and garden plants, the place of depositing eggs, and the relation of this to the food supply, the means of defense (color relation), and the homes of insects. Each pupil will be supplied with a lens for use in the field, and compound microscopes will be used in the classroom.

Records of the observations in nature-study will be kept in writing or in painting, and an attempt will be made to have a complete story told. Because the best results in this subject come from continued observations growing out of the spontaneity of the pupils, set lessons on the subject will not be assigned, but the work will be carried on in committees, each pupil, so far as possible, being allowed to choose his particular line of investigation. In order to keep every child in touch with the whole work, the committees will report at regular intervals. Jackman's *Nature Study in the Grammar Grades* will be used as a manual.

An inquiry into the causes of the phenomena will establish the unity of the various phases of the observational work. This will necessitate a more or less systematic study of seasonal changes as dependent on the annual motion of the sun. Enough of such study will be given to make the unity and bearing of the work clear to the pupils.

Mathematics.—The mathematical work will comprise the algebra which grows easily out of the arithmetic, and will be of the nature of a review and emphasizing of the fundamental principles of the arithmetic. Graphical representation of data will receive attention. It is believed that this work will

lay a broad and sound foundation for the work of the secondary school, while it will fix the arithmetical processes upon the mind of the pupil and render their application flexible. The algebra will be closely correlated with such concrete or experimental geometry as will reinforce the algebra by clarifying and sharpening algebraic concepts.